

**LISTING OF CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A diverse population of labels, comprising about thirty or more unique labels, wherein each of said unique labels is bound comprises at least two anti-genedigits to a nucleic acid molecule by attachment of label monomers of said unique labels to nucleotides in a 1:1 correspondence.
2. (Currently Amended) The diverse population of claim 1, wherein each of said unique labels further comprises has about the same unit signal, or a multiple thereof.
3. (Currently Amended) The diverse population of claim 1, wherein each of said unique labels further comprises a mixture of two or more different labels label monomers.
4. (Currently Amended) The diverse population of claim 1, further comprising unique labels having a diversity selected from a group consisting of about 40, 60, 80, 100, 120 and 140.
5. (Currently Amended) The diverse population of claim 1, further comprising unique labels having a diversity of about 150.
6. (Currently Amended) The diverse population of claim 1, wherein said unique labels are fluorescent.
7. (Currently Amended) A diverse population of uniquely labeled probes, comprising about thirty two or more target specific nucleic acid probes, wherein the specific nucleic acid probes are each attached in a 1:1 correspondence to at least two genedigits a unique label bound to a nucleic acid, label monomers of said unique labels being attached to nucleotides in a 1:1 correspondence.
8. (Currently Amended) The diverse population of claim [[7]]86, wherein each of said unique labels further comprises has about the same unit signal, or a multiple thereof.

9. (Currently Amended) The diverse population of claim [[7]]86, wherein each of said unique labels further comprises a mixture of two or more different labels label monomers.

10. (Currently Amended) The diverse population of claim [[7]]86, further comprising a diversity of different labels selected from a group consisting of ~~about~~ 50, 100, 200, 500, 1,000, 2,000, 5,000,  $1 \times 10^4$  and  $3 \times 10^4$  unique labels.

11. (Currently Amended) The diverse population of claim [[7]]86, further comprising a diversity of ~~about~~  $1 \times 10^5$  unique labels.

12. (Currently Amended) The diverse population of claim [[7]]86, wherein said unique labels are fluorescent.

Claims 13-15 (Canceled)

16. (Withdrawn) A method of producing a population of labels, comprising synthesizing a population of nucleic acids, each of said nucleic acids within said synthesized population having bound a predetermined ratio of at least two different labels, wherein said population of labels has a diversity of predetermined ratios of about 30 or more.

17. (Withdrawn) The method of claim 16, wherein each of said nucleic acids bound by a predetermined ratio of at least two labels further comprises about the same unit signal.

18. (Withdrawn) The method of claim 16, wherein said diversity is selected from the group consisting of 40, 60, 80, 100, 120, 140 and 150.

19. (Withdrawn) The method of claim 16, wherein said diversity is selected from the group consisting of 200, 500, 2,000, 5,000,  $1 \times 10^4$ ,  $3 \times 10^4$  and  $1 \times 10^5$ .

20. (Withdrawn) The method of claim 16, wherein said labels are fluorescent.

21. (Withdrawn) The method of claim 16, wherein said of said nucleic acids within said synthesized population further comprise an anti-genedigit.

22. (Withdrawn) The method of claim 16, wherein each of said nucleic acids within said synthesized population further comprise a target specific probe.

23. (Withdrawn) A method of attaching a label to a nucleic acid probe, comprising hybridizing a nucleic acid probe having a genedigit to an anti-genedigit having a label, said genedigit comprising a set of three or more repeat sequences, said anti-genedigit comprising a cognate set of at least two complimentary repeat sequences, wherein said anti-genedigit specifically hybridizes to said genedigit through a sequence having a complexity less than the number of hybridized base pairs.

24. (Withdrawn) The method of claim 23, wherein said nucleic acid probe further comprises a specifier.

25. (Withdrawn) The method of claim 24, wherein said specifier further comprises four or more genedigits.

26. (Withdrawn) The method of claim 24, wherein said specifier further comprises five or more genedigits.

27. (Withdrawn) The method of claim 23, wherein said genedigit further comprises a set of four or more repeat sequences.

28. (Withdrawn) The method of claim 23, wherein said anti-genedigit further comprises a cognate set of three or more complimentary repeat sequences.

29. (Withdrawn) The method of claim 23, wherein said repeat sequences or complimentary repeat sequences further comprise about 8 nucleotides.

30. (Withdrawn) The method of claim 23, wherein said complexity is about 8.

31. (Withdrawn) The method of claim 23, wherein said number of hybridized base pairs is about 24.

32. (Withdrawn) The method of claim 23, further comprising hybridizing a population of nucleic acid probes having different genedigits to a population of different anti-genedigits each having unique labels to produce a population of uniquely labeled nucleic acid probes.

33. (Withdrawn) The method of claim 32, wherein said nucleic acid probe further comprises a specifier.

34. (Withdrawn) A method of producing a population of nucleic acid probes, comprising:

(a) producing a first population of nucleic acids comprising two or more target specific probes each having at least one genedigit, said genedigit having a set of three or more repeated sequences;

(b) producing a second population of nucleic acids comprising an anti-genedigit having a cognate set of at least two complimentary repeated sequences, and

(c) hybridizing said first and second populations of nucleic acids to produce a population of target specific probes attached to an anti-genedigit, wherein said anti-genedigit hybridizes to said genedigit through a sequence having a complexity less than the number of hybridized base pairs.

35. (Withdrawn) The method of claim 34, wherein said target specific probes further comprise a specifier.

36. (Withdrawn) The method of claim 35, wherein said specifier further comprises four or more genedigits.

37. (Withdrawn) The method of claim 35, wherein said specifier further comprises five or more genedigits.

38. (Withdrawn) The method of claim 34, wherein said genedigit further comprises a set of four or more repeat sequences.

39. (Withdrawn) The method of claim 34, wherein said anti-genedigit further comprises a cognate set of three complimentary repeat sequences.

40. (Withdrawn) The method of claim 34, wherein said repeat sequences or complimentary repeat sequences further comprise about 8 nucleotides.

41. (Withdrawn) The method of claim 34, wherein said complexity is about 8.

42. (Withdrawn) The method of claim 34, wherein said number of hybridized base pairs is about 24.

43. (Withdrawn) The method of claim 34, wherein said two or more target specific probes further comprise at least one different genedigit.

44. (Withdrawn) The method of claim 34, wherein said population of anti-genedigits further comprises two or more different anti-genedigits.

45. (Withdrawn) The method of claim 34, wherein said anti-genedigit further comprises a label.

46. (Withdrawn) The method of claim 44, wherein said two or more different anti-genedigits further comprise unique labels.

47. (Withdrawn) The method of claim 34, further comprising hybridizing a population of target specific probes having different genedigits to a population of different anti-genedigits each having a unique label to produce a population of uniquely labeled nucleic acid probes.

48. (Withdrawn) The method of claim 47, wherein said target specific nucleic acid probe further comprises a specifier.

49. (Withdrawn) A method of producing a population of uniquely labeled nucleic acid probes, comprising:

(a) synthesizing a population of target specific nucleic acid probes each having a different specifier;

(b) synthesizing a corresponding population of anti-genedigits each having a unique label, said population having a diversity sufficient to uniquely hybridize to genedigits within said specifiers, and

(c) hybridizing said populations of target nucleic acid probes to said anti-genedigits, to produce a population wherein each of said target specific probes is uniquely labeled.

50. (Withdrawn) A method of detecting a nucleic acid analyte, comprising:

(a) contacting a mixture of nucleic acid analytes with a plurality of target specific probes each attached to a unique label bound to a nucleic acid under conditions sufficient for hybridization of said probes to said target, and

(b) measuring a signal from one or more said target specific probes hybridized to an analyte, wherein said signal uniquely identifies the analyte species.

51. (Withdrawn) The method of claim 50, wherein each of said unique labels further comprises about the same unit signal, or multiple thereof.

52. (Withdrawn) The method of claim 50, wherein each of said unique labels further comprises a mixture of two or more different labels.

53. (Withdrawn) The method of claim 50, wherein said plurality of target specific probes further comprises different target specific probes selected from the group consisting of about 50, 100, 200, 500, 1,000, 2,000, 5,000  $1\times 10^4$ ,  $3\times 10^4$  and  $1\times 10^5$ .

54. (Withdrawn) The method of claim 50, wherein said plurality of target specific probes further comprises at least one target specific probe for each nucleic acid analyte in said mixture.

55. (Withdrawn) The method of claim 50, wherein said mixture further comprises an expressed RNA population or DNA copy thereof.

56. (Withdrawn) The method of claim 50, wherein said labels are fluorescent.

57. (Withdrawn) The method of claim 50, wherein said target specific nucleic acid further comprises said nucleic acid bound to said unique label.

58. (Withdrawn) The diverse population of claim 50, further comprising two attached populations of nucleic acids, one population of nucleic acids comprising said plurality of target specific nucleic acid probes, and a second population of nucleic acids comprising said nucleic acid bound by a unique label.

59. (Withdrawn) The diverse population of claim 50, further comprising a nucleic acid species selected from the group consisting of a specifier, and antispecifier, a genedigit, an anti-genedigit and a dendrimer.

60. (Withdrawn) The method of claim 50, further comprising detecting a single copy of an analyte within said mixture.

61. (Withdrawn) A method of detecting a nucleic acid analyte, comprising:

(a) contacting a mixture of nucleic acid analytes under conditions sufficient for hybridization with a target specific probe having at least one genedigit, said genedigit having a set of three or more repeated sequences;

(b) contacting said mixture under conditions sufficient for hybridization with an anti-genedigit having a cognate set of at least two complimentary repeated sequences, and

(c) detecting a hybridized complex comprising said analyte, target specific probe and said anti-genedigit, wherein said anti-genedigit hybridizes to said genedigit through a sequence having a complexity less than the number of hybridized base pairs.

62. (Withdrawn) The method of claim 61, wherein said target specific probe further comprises a specifier.

63. (Withdrawn) The method of claim 62, wherein said specifier further comprises four or more genedigits.

64. (Withdrawn) The method of claim 62, wherein said specifier further comprises five or more genedigits.

65. (Withdrawn) The method of claim 61, wherein said genedigit further comprises a set of four or more repeat sequences.

66. (Withdrawn) The method of claim 61, wherein said anti-genedigit further comprises a cognate set of three complimentary repeat sequences.

67. (Withdrawn) The method of claim 61, wherein said repeat sequences or complimentary repeat sequences further comprise about 8 nucleotides.

68. (Withdrawn) The method of claim 61, wherein said complexity is about 8.

69. (Withdrawn) The method of claim 61, wherein said number of hybridized base pairs is about 24.

70. (Withdrawn) The method of claim 61, further comprising two or more target specific probes.

71. (Withdrawn) The method of claim 70, further comprising at least one different genedigit.

72. (Withdrawn) The method of claim 70, further comprising two or more different anti-genedigits.

73. (Withdrawn) The method of claim 61, wherein said anti-genedigit further comprises a label.

74. (Withdrawn) The method of claim 72, wherein said two or more different anti-genedigits further comprise unique labels.

75. (Withdrawn) The method of claim 61, further comprising a plurality of target specific probes having different genedigits and a plurality of different anti-genedigits each having a unique label.

76. (Withdrawn) The method of claim 75, wherein said target specific probes further comprise a specifier.

77. (Withdrawn) A method of detecting a nucleic acids analyte, comprising:

(a) contacting a mixture of nucleic acid analytes under conditions sufficient for hybridization with a plurality of target specific nucleic acid probes each having a different specifier;

(b) contacting said mixture under conditions sufficient for hybridization with a corresponding plurality of anti-genedigits each having a unique label, said plurality of anti-genedigits having a diversity sufficient to uniquely hybridize to genedigits within said specifiers, and

(c) uniquely detecting a hybridized complex between one or more analytes in said mixture, a target specific probe, and an anti-genedigit.

78. (Currently Amended) A nucleic acid labeling kit, comprising at least one target specific nucleic acid probe bound to at least two a set of genedigits, a set of and at least two anti-genedigits and a unique set of labels bound to a nucleic acid molecule by attachment of label monomers of said unique labels to nucleotides in a 1:1 correspondence.

Claim 79 (Canceled)

80. (Original) The kit of claim 78, further comprising a dendrimer.

81. (Currently Amended) The kit of claim [[78]]89, wherein said unique label further comprises a ratio of two different labels the label monomers are combined at different ratios.

82. (Currently Amended) The kit of claim [[78]]89, wherein said label is the label monomers are fluorescent.

Claims 83-84 (Canceled)

85. (New) The diverse population of claim 3, wherein the label monomers are combined at different ratios.

86. (New) The diverse population of claim 7, further comprising two anti-genedigits bound to said genedigits, thereby forming unique labels.

87. (New) The diverse population of claim 7, further comprising at least thirty target specific nucleic acid probes.

88. (New) The diverse of population of claim 9, wherein the label monomers are combined at different ratios.

89. (New) The kit of claim 78, wherein the anti-genedigits are bound to label monomers.